PATENT APPLICATION

OF

GENE KELLY NORRIS

FOR

A HALOGEN-CONTAINING POLYMER COMPOSITION STABILIZED BY A LATENT MERCAPTAN AND A MIXTURE OF A ZINC CARBOXYLATE AND ZINC CHLORIDE

DN A01062 RMD/JHR/am

U. S. Express Mail Label No. EF385420273US

A HALOGEN-CONTAINING POLYMER COMPOSITION STABILIZED BY A LATENT MERCAPTAN AND A MIXTURE OF A ZINC CARBOXYLATE AND ZINC CHLORIDE

FIELD OF THE INVENTION

This invention relates to a heat stabilized polymer composition normally susceptible to heat-induced deterioration which comprises a halogen-containing polymer and the degradation products of a latent mercaptan present during extrusion, injection molding and other processing of the composition at an elevated temperature, said products being formed during said processing and including a liberated mercaptan. The liberated mercaptan enhances the activity of metal-based heat stabilizers such as zinc carboxylates, zinc chloride, organotin carboxylates and mercaptides in the polymer composition. It particularly relates to the stabilization against heat of vinyl chloride polymer compositions by a latent mercaptan in combination with very low levels of a synergistic mixture of zinc chloride and a zinc carboxylate.

This invention also relates to articles of manufacture such as rigid pipe and window profile, clear flexible film, and semi-rigid tubing that are prepared from such heat-stabilized vinyl chloride polymer compositions.

BACKGROUND OF THE INVENTION

It is well known that the physical properties of various organic polymers deteriorate and color changes take place during processing of the polymer and during exposure of formed polymer products to certain environments. Halogen-containing

polymers are normally susceptible to heat-induced deterioration through autoxidation. The prime examples of such polymers are the vinyl and vinylidene polymers in which the halogen is attached directly to carbon atoms. Poly(vinyl chloride), copolymers of vinyl chloride and vinyl acetate, and poly(vinylidene chloride), the principal resin in self-clinging transparent food wraps, are the most familiar polymers which require stabilization for their survival during fabrication into pipe, window casings, siding, bottles, wall covering, packaging film, and the like. When such polymers are processed at elevated temperatures, undesirable color changes often occur within the first 5 to 10 minutes as well as during later stages of the processing. Haziness, which sometimes accompanies the color changes, is particularly undesirable where clear products are needed. The addition of heat stabilizers to such polymers has been absolutely essential to the wide-spread utility of the polymers. From a great deal of work in the development of more and more effective heat stabilizers there has emerged two principal classes: organotin compounds and mixed metal combinations. Organotin-based heat stabilizers are the most efficient and widely used stabilizers for rigid PVC. Synergistic combinations of alkyltin mercaptides and free mercaptans are particularly efficient heat stabilizers for rigid PVC during extrusion. They have not been entirely satisfactory, however, because of several failings on the part of the mercaptan synergist and are not used in flexible PVC. Many mercaptans give off an offensive odor even at room temperature and the odor grows worse at PVC processing temperatures. The oxidative stability of the mercaptans is very often very poor. Oxidation of the free mercaptans diminishes the synergism. A